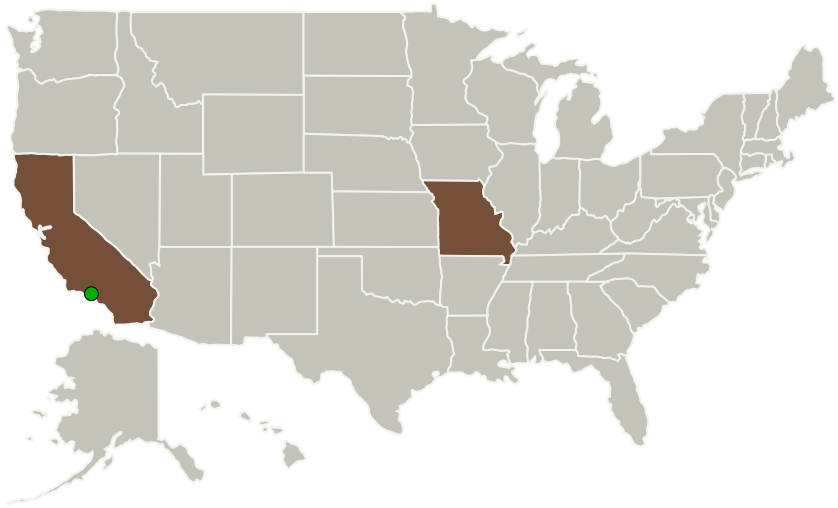
Multi-Disciplinary Analysis and Optimization of Integrated Spacecraft System Models, Phase I

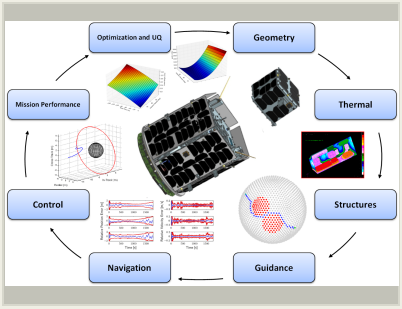
Completed Technology Project (2015 - 2016)

Project Introduction

M4 Engineering and Missouri S&T propose to investigate the viability of creating a multidisciplinary analysis and optimization architecture for analyzing spacecraft system models. The current approach will utilize commercial off-the-shelf (COTS) software to alleviate acquisition hurdles for NASA (and public) technical monitors/reviewers. Next, a preliminary set of analysis modules will be developed including a CAD-based Geometry component capable of generating parametric geometry. Once the analysis modules are completed, integration within the OpenMDAO framework will commence. The MDAO tool will be developed to address the issues of being generic and scalable to larger spacecraft systems. Validation of the modules and the prototype tool will be carried out by constructing model problems to test various capabilities as well as a complete spacecraft system demonstration application with optimization of integrated multidisciplinary performance models.

Primary U.S. Work Locations and Key Partners





Multi-disciplinary Analysis and Optimization of Integrated Spacecraft System Models, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
M4 Engineering, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Long Beach, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
Missouri University of Science and Technology	Supporting Organization	Academia	Rolla, Missouri

Primary U.S. Work Locations	
California	Missouri

Project Transitions

June 2015: Project Start

June 2016: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139255)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

M4 Engineering, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

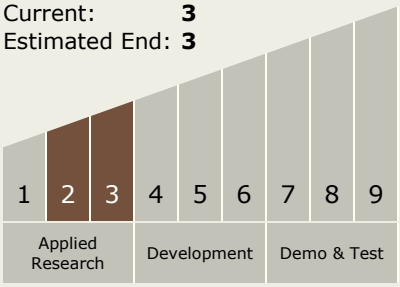
Carlos Torrez

Principal Investigator:

Tyler Winter

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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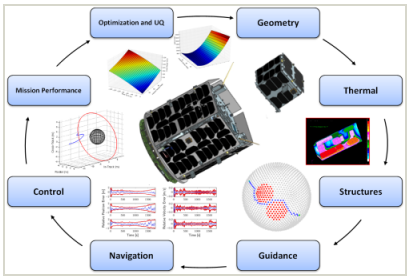
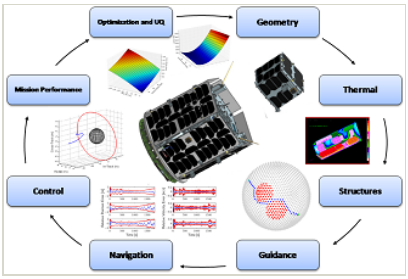
Completed Technology Project (2015 - 2016)

Images



Briefing Chart Image
Multi-disciplinary Analysis and Optimization of Integrated Spacecraft System Models, Phase I Briefing Chart Image
(https://techport.nasa.gov/image/130238)



Final Summary Chart Image
Multi-disciplinary Analysis and Optimization of Integrated Spacecraft System Models, Phase I Project Image
(https://techport.nasa.gov/image/129136)

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.2 Modeling
    - TX11.2.2 Integrated Hardware and Software Modeling

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System